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Per Enflo* (enflo@math.kent.edu). *Groups modeled on Banach Spaces.*

In 1900 Hilbert asked - his fifth problem - in particular, if a locally Euclidean group must be a Lie group. The affirmative answer to this was given fifty years later, through the joint efforts of several researchers. One can ask similar questions on groups modeled on Banach Spaces - whether a certain regularity of the group operations will make the group an infinite-dimensional Lie group. Not surprisingly, the geometry of the Banach Space will be important for the answer. There are many positive results and many counterexamples for this type of questions. I will give a survey on what is known and on open problems in this area. (Received September 14, 2010)